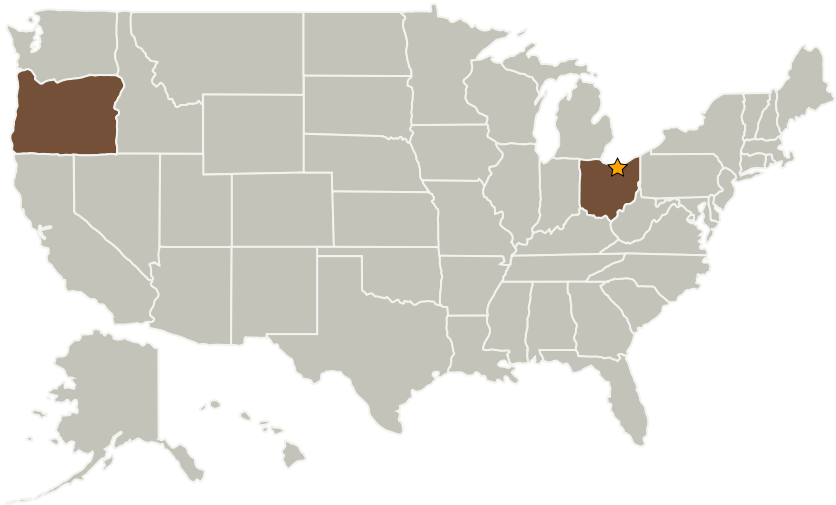
Microwave Powered Gravitationally Independent Medical Grade Water Generation, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

Development of an innovative microwave-based continuous flow sterilization system for the energy efficient gravitationally independent production of Medical Grade Water (MGW) is proposed. During the Phase I, microwaves were very efficiently coupled to a single-phase flowing water stream using an antenna based microwave sterilization chamber that rapidly heated water to temperatures well above normal autoclave conditions. Microbial sterilization was demonstrated for single and mixed cultures of gram-positive and gram-negative bacteria including Bacillus stearothermophilus, a thermophilic spore former utilized to validate autoclave sterilization. Novel ultrahigh temperature sterilization processes eliminated chemical sterilization requirements for external connections, and more significantly, inactivated endotoxins, a major MGW purity requirement. These attributes results in an extremely low ESM, MGW generator that will meet autonomous medical care needs for MGW aboard manned spacecraft, or Lunar and planetary habitations. A fully functional computer controlled prototype capable of producing MGW from NASA potable water without expendables will be developed during the Phase II. To achieve these objectives, a compact controllable microwave power generator will be mated to an optimized sterilization chamber producing an energy efficient MGW generator without the need for expendables. Characterization of system performance and ESM will provide the basis for future NASA development decisions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
UMPQUA Research Company	Supporting Organization	Industry	Myrtle Creek, Oregon

Primary U.S. Work Locations	
Ohio	Oregon

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.4 Remediation